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THE CONSTRUCTION OF THE LORAIN DRY DOCK AND SHIPYARD OF THE CLEVELAND SHIP-BUILDING COMPANY.

By JAMES RITCHIE, M. Am. Soc. C. E.

PRESENTED APRIL 20TH, 1898.

In November, 1896, the Cleveland Ship-Building Company, of Cleveland, O., decided to remove its shipyard from its location in Cleveland, on account of the necessity of enlarging the plant and of constructing a dry dock in connection with the same, in order that repairs to vessels could be made within the limits of its own territory. With this object in view, the author was directed to make certain preliminary investigations of property in Loraine, O., located at the mouth of Black River, 26 miles west of Cleveland, to determine its availability for such purposes. These investigations were commenced in December, 1896, and consisted of a series of soundings and borings on the property to determine the character of the underlying strata. The soundings were made with a 3-in. test auger and extended to a depth of 51 ft. in the deepest place. The tests were made as nearly as possible on the center line of the proposed dry dock, on the easterly side of Black River and about half a mile from the lake.

The surface of the ground consisted of marsh mud, the level of the highest point of the marsh being about 1 ft. above the ordinary stage of water in the river, which is the zero of the Government gauge. The marsh was covered with a heavy growth of reeds and grass, and was highest close to the river, along the bank of which it was possible to walk at all times, while 100 ft. back from the river the marsh was lower than the water level and was soft and miry. The depth of the marsh mud varied from 7 to 15 ft., as shown upon the profile of the soundings (Fig. 1). Below the mud there was an inferior sort of bluish clay, which increased in stiffness with every foot of depth. At several of the test holes a small stratum of gravel was found, but it was in all cases below the level of the bottom of the proposed dry dock and was not deemed dangerous to the work. The result of the investigations was such that the location was fixed and the plans and specifications prepared by the author during the months of January and February, 1897.

The first work to be commenced was the dry dock, and it will be described to completion, without reference to the remainder of the work, which was going on at the same time, and which will be described in the latter portion of this paper.

The plans prepared contemplated a dry dock 560 ft. in total length, 98 ft. wide at the top, between copings, 56 ft. wide at the bottom and 23 ft. total depth. The entrance was to be 60 ft. wide at the bottom and 66 ft. at the top, with a depth of 17 ft. of water on the sill at the ordinary stage. The plans were modified by decreasing the depth of the dock to 21 ft., which increased the bottom width to 59 ft. The width of the entrance was not changed. Fig. 1 shows the general plan and sections of the dock, the only change from the original being that the width on top, in the clear, between copings, is 96 ft.

Construction was commenced on February 22d, 1897. The first work consisted in enclosing three sides of the proposed dock by a water-tight protection of sheet piling, placed 25 ft. away from the top of the dock. This is shown in Fig. 1 of Plate XIII. This protection was built of a single line of oak piles, 30 ft. long, driven 10 ft. apart and connected by a waling timber of 10 x 12-in. Norway pine, drift-bolted to each pile on the side away from the dock with 1-in. drift bolts. Outside of this waling piece was driven a row of sheet piling 6 ins. thick and from 20 to 26 ft. long, double grooved on the

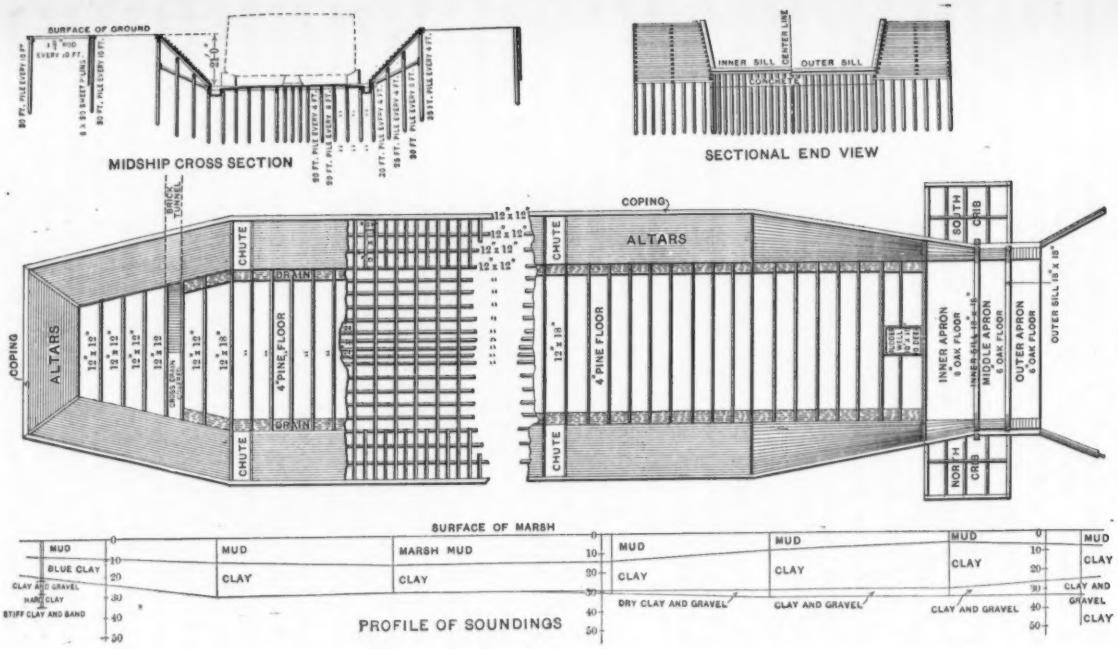

SURFACE OF GROUND
MIDSHIP CROSS SECTION
INNER SILL
OUTER SILL
SECTIONAL END VIEW
COPING
ALTARS
CHUTE
DRAIN
4" PINE FLOOR
INNER APRON
6" OAK FLOOR
MIDDLE APRON
OUTER APRON
SOUTH CRIB
NORTH CRIB
SURFACE OF MARSH
MUD
BLUE CLAY
CLAY AND GRAVEL
HARD CLAY
STIFF CLAY AND SAND
MARSH MUD
CLAY
DRY CLAY AND GRAVEL
PROFILE OF SOUNDINGS

FIG. 1.

edges and tongued with 2 x 4-in. pine, spiked into one piece of the sheeting. The tongues were of well-seasoned lumber, and, when in place, it was found that they had so swelled as to make the joints thoroughly water tight. While this work was in progress, the upper row of piling for the dock itself was driven; the piles being of white oak, 35 ft. long, spaced 4 ft. apart, and extending along the north and south sides and the east end of the dock.

On the completion of this work the space between the piles last mentioned was dredged out to a depth of 24 ft., excepting that at the entrance, where it was proposed to place the coffer-dam, the dredging was only carried to a depth of 9 ft., or just sufficient to permit the entrance of the dredge and scows. The dredging left the banks of the excavation standing at a slope of about 1 to 1, and the top row of piling was thereby protected, and served also to some extent to hold the upper stratum of muck from sliding in.

The coffer-dam was constructed across the opening, extending from the north to the south line of the protection sheet-piling. It was built by first driving two rows of 30-ft. oak piles 10 ft. apart; the piles being spaced at 10 ft. centers in each row, and connected by a 10 x 12-in. waling timber; and secondly, by driving a double wall of 6-in. tongued and grooved sheet piling, 26 ft. long, back of the waling timbers. The two walls were braced together by 8 x 8-in. diagonal braces and 1½-in. iron rods, after the manner of the lateral bracing of a Howe truss bridge. On the river side of the dam, and 25 ft. from the same, was driven a row of 35-ft. oak piles, secured to each other by 12 x 12-in. timbers back of the piles. To these timbers the piling of the coffer-dam was anchored by 1½-in. iron rods every 3 ft. The space between the anchor piles and the coffer-dam was filled with clay, which was banked up against the anchor piles to a height sufficient to protect the dam from the action of waves or from changes of level in the river. As the depth of water on each side of the dam was only 9 ft., the pressure upon the dam after pumping out was not excessive, as the natural ground below sustained the main weight. As soon as the pumping had progressed far enough, a second row of piles was driven on the side toward the dock, and the inside of the dam was shored up against these by timbers. The pumping was done slowly and was suspended at intervals to admit of driving the intermediate rows of slope piling, which was done from a floating driver. As the pumping

progressed and the water receded from the sheet piling, anchor piles were driven, and the sheet piling was secured thereto by 1¼-in. rods. The falling water caused the banks to cave off to some extent, and in two places the upper slope rows were disturbed and had to be re-driven for about 150 ft. on the south, and 200 ft. on the north side. There was practically no leakage through the sheet piling, until after the caving above mentioned, but water came in through the bottom of the dock, accompanied by marsh gas in considerable quantities. The water appeared to come up from a deep stratum and was 27° colder than the water in the river.

A second set of soundings was made in the bottom of the dock, and a vein of gravel was found through which the water appeared to come. A second row of sheet piling was driven inside the first row and to a depth of 20 ft. below the bottom of the dock, and this appeared to cut off a portion of the inflow. The remainder, being not enough to impede the work of construction, was left to be taken care of as became necessary.

The removal of the loose material left after dredging, and which had slid in during the pumping, and the work of bringing the bottom to the required grade, was commenced at the entrance of the dock in order that that portion might be first protected. The excavation was then continued toward the head of the dock at as nearly as possible the same rate as the pile-driving could be done. The material excavated was lifted out by derricks, loaded into mud scows and dumped in the lake. A portion of the excavated material was dumped by the derricks upon the adjoining marsh north of the dock. This was a mistake, as the weight of the material caused a break in the sheet piling at the same point as (previously stated) the caving off occurred, and the bottom of the dock appeared to be heaved up and to slide over the center from the north to the south side. At the same time, the surface of the marsh above sunk about 3 ft. This difficulty was finally surmounted, although it caused considerable trouble by increasing the amount of excavation, but as soon as the piling of the bottom was driven and the transverse timbers were put in place, this upward movement ceased.

The pile-driving of the bottom was commenced at the entrance of the dock, under the abutment cribs, and was continued toward the head of the dock as rapidly as the excavation allowed. There were

two drivers in the dock, and each was employed constantly. A 2 000-lb. hammer was used in driving the piles, and, while at first they drove very easily, they finally gave indications of good bearing. Where it was thought best, longer piles than those called for by the plans were used. Extra piles were driven around all places where water appeared in the bottom, and the result was that nearly all the springs were stopped by the consolidation of the ground, only three or four leaks being left to the last, and these were led into the permanent drains and taken off by the pumps.

The piles under the slope timbers are of white oak and are driven in three rows on each slope, being 35, 30 and 25 ft. long, respectively. Those under the bottom of the dock and under the cribs at the entrance are 20 ft. long, and those under the aprons 25 ft. long. These are of various woods, such as beech, elm, pin-oak, hard maple, etc. The specifications required all piles to have a diameter of 12 ins. at a distance of 3 ft. from one end, and a diameter of not less than 6 ins. at the other end, in a length of 35 ft., and proportionally for shorter lengths.

The piling of the bottom consists of fifteen longitudinal rows, the five rows under the center and one under the foot of each slope having the piles spaced 4 ft. apart, and the other eight rows having them 8 ft. apart. Each row is capped with 12 x 12-in. oak, the timbers in adjoining rows breaking joint with each other. Upon these longitudinal timbers are placed the transverse timbers which support the keel and bilge blocks. These are 12 x 18 ins. and 64 ft. long, placed every 8 ft. and notched 2 ins. over the longitudinal timbers, so as to brace the rows of piling. These timbers are of Douglas fir, from the Pacific coast. They extend clear across the bottom of the dock and support the main slope timbers. Between each transverse timber at the foot of the slopes there is placed a 14 x 14-in. timber framed into the 12 x 18-in. timbers and resting on top of the 12 x 12-in. longitudinals. This is to receive the intermediate slope timbers, and at the same time close the foot of the slopes against the earth behind the same.

The three rows of slope piles are also capped longitudinally with 12 x 12-in. oak, and each row is independently braced to the transverse timbers of the dock, so that any inward movement of either will be resisted by the bottom of the dock and the opposite slope. These are additional to the regular slope timbers which also brace the piling.

The slope timbers are 12 x 12-in. oak at every transverse bottom timber, and 8 x 12-in. oak at intermediate points. These timbers are framed into their supports, and form an additional brace to the top as well as serving their primary purpose of supporting the altars.

The slope timbers are covered with 1-in. rough pine boards nailed to each timber. At intervals of about 100 ft., along each side of the dock, chutes are constructed, by placing two 8 x 12-in. oak timbers on top of two of the 12 x 12-in. slope timbers, and filling in between them with 6-in. oak plank. These are to be used for putting material for repairs in and out of the dock without injury to the altars.

The entrance to the dock is protected by two abutment cribs, each 32 x 28 ft. and 24 ft. high, resting upon 48 piles. The capping of the piles and the two upper courses of timber in the cribs are of white oak; the remainder of the timber is hemlock. The outer walls are of 12 x 14-in., and the inner walls of 12 x 12-in. timbers. The framing is dovetail work. All the courses are drift-bolted with 1-in. by 30-in. drift bolts, and all the joints are caulked with pitch and oakum. The sills and jambs for holding the gate in place are 18 x 18-in. oak, well braced and bolted in position. The jambs are sunk 2 ins. into the walls of the cribs, and are bolted through the walls and through 12 x 18-in. inside pieces of oak. The apron timbers, of 12 x 12-in. oak, run across the entrance, and are built into the cribs at each end. They rest upon piles between the cribs. There are two rows of piles and timbers under each sill, and these are braced together and to the adjoining timbers with 12 x 12-in. oak braces. Outside of the outer apron there is a line of 6-in. tongued and grooved sheet piling, 20 ft. long, extending across the entire opening and returning at each end to the face of the cribs, where it is connected to the line of sheet piling, 6 ins. thick and 30 ft. long, which is driven from the north end of the north crib to the south end of the south crib, and thence carried to the protection sheet piling of the dock. A third row of sheet piling, 30 ft. long, extends from crib to crib in front of the inner sill, thence coming forward along the cribs to the sheet piling in front of them.

The entire apron, inside of the outer row of sheet piling and to the inside line of the cribs, is filled in with cement concrete, made of broken limestone and American Portland cement. The depth of this concrete varies from 4 ft. at the outer apron and 5 ft.

under the middle apron to about 2 ft. at the inside of the inner apron. The cribs are filled with puddled clay. The space behind the slope timbers of the dock, and the entire bottom of the dock between the piling and the timbers, is filled with well puddled clay. As soon as the clay was filled in behind the slopes and in the bottom, the floor of the dock and the altars on the slopes were put in. The dock floor consists of 4-in. pine plank laid on furring strips on the longitudinal timbers, so that the floor is from 4 to 6 ins. lower than the top of the transverse timbers. The floor pitches from the center to each side, and the drains, built of 2-in. plank, run along each side, and empty into a cross drain at the east end of the dock. The cross drain is covered for half its length, and the remainder is protected by a grating of 1-in. iron bars, having 2-in. openings between them. This drain empties into a brick tunnel, 5 ft. in diameter and 96 ft. long, leading to the pumps.

The altars or steps of the slopes are made by cutting diagonally through 10 x 14-in. timbers, so as to leave two edges, making a 10-in. rise and a 10-in. tread, and a third edge 2 ins. wide, to rest upon the step below. These altars are of white pine, and are spiked to the oak timbers with 12-in. spikes.

All the oak timber is drift-bolted to the piling, and to other timbers with 1-in. drift bolts of such lengths as the sizes of the timbers required.

The coping of the dock consists of two pieces of 12 x 12-in. oak, laid side by side, and resting partly upon the upper altar and partly upon the cap of the upper slope row of piles, being drift-bolted to the cap and edge and bolted to each other.

The rudder well is located just inside of the inner apron and is 10 ft. wide, 15 ft. long and 10 ft. deep. It is protected by 6-in. tongued and grooved sheet piling, 20 ft. long, securely bolted to the timbers of the dock. It has a concrete bottom 2 ft. thick.

The gate is of steel, and is shown in Figs. 2 and 3. It is 62 ft. long on the bottom, 68 ft. on the top, including the jambs, and is 19 ft. high. The keel and jambs are made of two 15-in. channels, braced with plates and angles, and protected on the outside with 6 x 14-in. oak timbers, to which are fastened rubber gaskets. The gate is fitted with valves for filling and emptying the various compartments, and also with eight 30-in. gate valves for filling the dock.

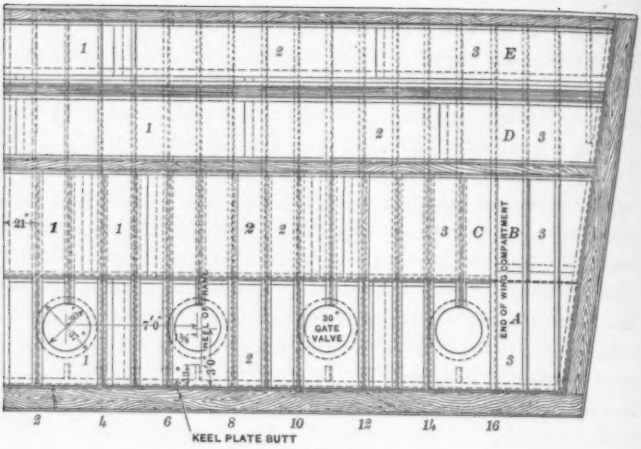
FIG. 1.

FIG. 2.

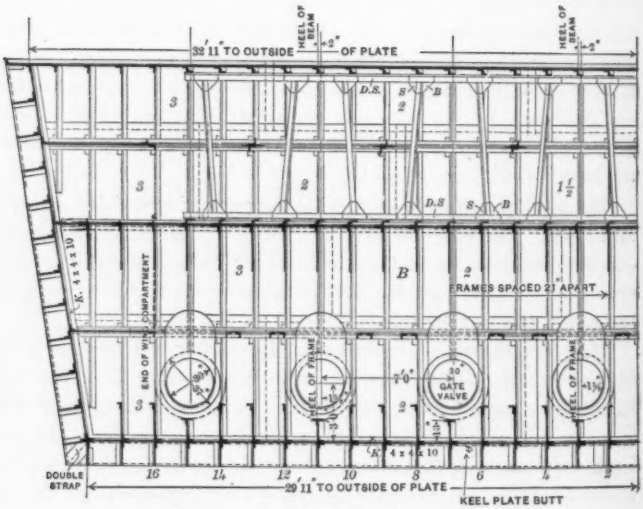
The pumps are located in the engine-room of the power house, directly over the well into which the tunnel empties. They are two in number, each having a 30-in. discharge, and a combined capacity of about 50 000 galls. per minute. Each pump is operated independently by a single engine. The well is 6 x 10 ft. and 17 ft. deep. Its top is level with the engine-room floor, which is 10 ft. below the top of the dock, and is covered by a cast-iron plate, 10 x 14 ft., bedded in cement, upon the 24-in. brick walls of the well, and bolted down to the same with 28 bolts, 1 in. in diameter and from 5 to 8 ft. long. The suction pipes enter the well through packing boxes in this plate. There is also a manhole and a ladder for entering the well. The construction of the timber work was completed and the keel and bilge blocks placed in position on January 14th, 1898, but the filling in of clay behind the slopes was not finished then. The water was let into the dock through a sluiceway in the coffer-dam on the 15th and 16th of January, and on the 17th the work of removing the coffer-dam was commenced. This was completed on January 23d, and on the following day the gate was put in place and the pumps started. The dock was pumped out in two hours; and it was found that the gate and cribs and all the work were practically water-tight. On January 26th the water was let in through six of the eight valves, and the dock filled in thirty-five minutes. On the same day the steamer *Sir William Fairbairn*, of the Bessemer Steamship Company, was successfully docked in two hours, and without injury to either the vessel or the dock. See Fig. 2, Plate XIII.

The work of filling in behind the slopes was completed on April 12th, 1898. The material used for filling and puddling was yellow clay obtained from excavations in the bluffs back of the marsh. The excavated material was also used in bringing the marsh to grade for the construction of the shipyard.

The power house, as shown in Fig. 4, includes the machine shop, 40 x 30 ft.; the boiler room, 32 x 46 ft.; the coal room, 10 x 46 ft., and the engine room, 36 x 56 ft. There is an iron stack 6 ft. 8 ins. in diameter, and about 75 ft. high. The power house is of brick with concrete foundations. Considerable difficulty was experienced in its construction on account of its proximity to the dry dock and the desire of the company to commence work in the ship yard by October 1st, 1897. This compelled the building of the power



HALF ELEVATION



HALF SECTION

FIG. 2.

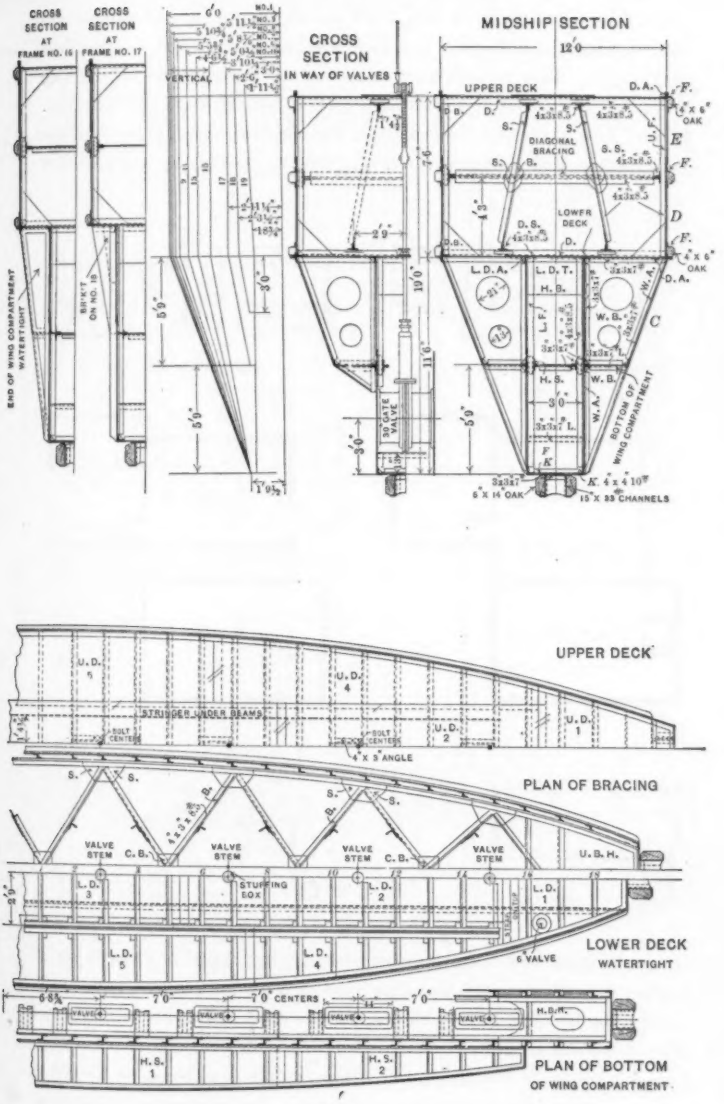

CROSS SECTION AT FRAME NO. 16
CROSS SECTION AT FRAME NO. 17
END OF WING COMPARTMENT WATERTIGHT
BRACKET ON NO. 18
VERTICAL
CROSS SECTION IN WAY OF VALVES
MIDSHIP SECTION
UPPER DECK
D. A.
DIAGONAL BRACING
LOWER DECK
L. D. A.
L. D. T.
H. B.
L. F.
W. B.
H. S.
W. A.
BOTTOM OF WING COMPARTMENT
6" X 6" OAK
6" X 14" OAK
15" X 33 CHANNELS
UPPER DECK
U. D. 5
U. D. 4
U. D. 3
U. D. 2
U. D. 1
STRINGER UNDER BEAMS
4" X 3" ANGLE
PLAN OF BRACING
VALVE STEM
C. B.
STUFFING BOX
U. B. H.
L. D. 3
L. D. 2
L. D. 1
L. D. 5
L. D. 4
6 VALVE
LOWER DECK WATERTIGHT
7'0" CENTERS
H. B. H.
H. S. 1
H. S. 2
PLAN OF BOTTOM OF WING COMPARTMENT

FIG. 3.

house before the walls of the dock could be put in, and trouble occurred when the bottom of the dock was suddenly raised, as described previously. This caused a movement in the foundation of the boiler room, but it was not sufficient to render it dangerous to the building. It was first proposed to construct the engine-room just west of the boiler room and close to the dock, and the excavation was made for

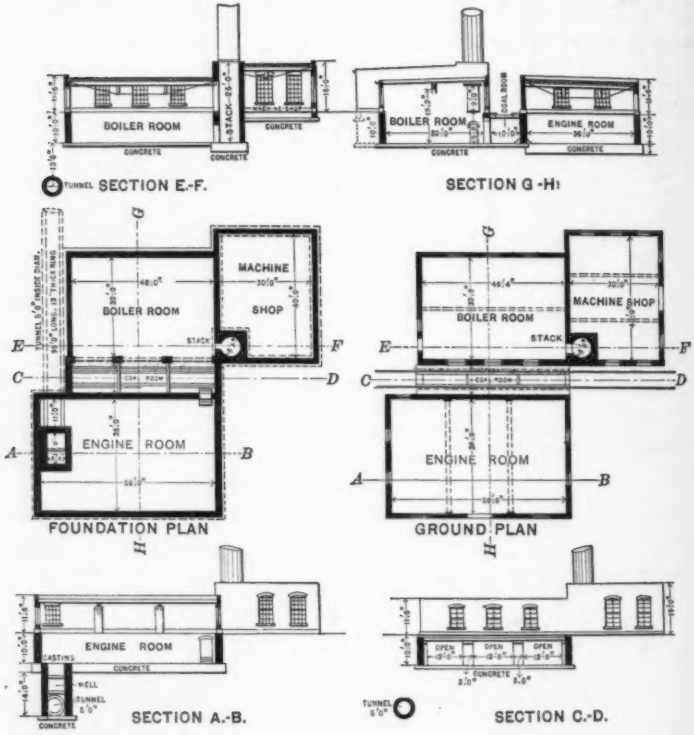


FIG. 4.

the pump well with this in view; but in making this excavation a sudden flow of gas and water drove the men out, and it was decided to change the location to that shown on the plan. In the work thereafter there was no difficulty. The engine-room contains, besides the pumps previously described, two other engines, one being an air compressor and the other an electric generator. The compressor furnishes

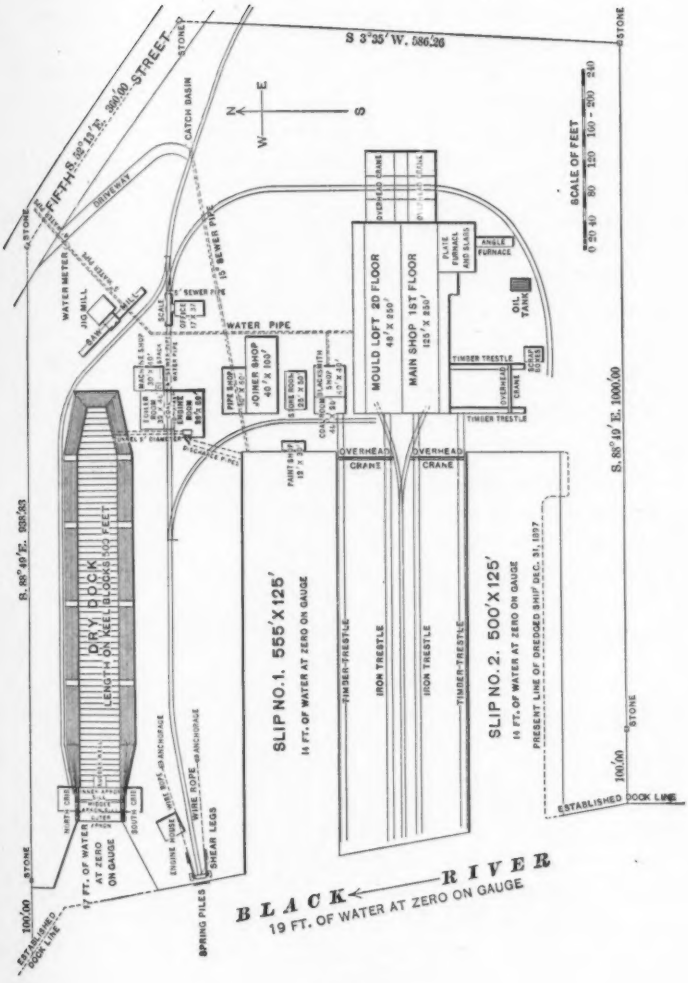

S 3°35' W. 586.26
FIFTH ST.
S. 82°15' E. 360.00
STREET
STONE
CATCH BASIN
DRIVEWAY
WATER METER
JIG MILL
SAW MILL
15" SEWER PIPE
WATER PIPE
OFFICE
SCALE OF FEET
0 20 40 80 120 160 200 280
MOULD LOFT 2D FLOOR
49' X 250'
MAIN SHOP 1ST FLOOR
125' X 250'
OVERHEAD CRANE
PLATE FURNACE
ANGLE FURNACE
OIL TANK
TIMBER TRESTLE
JOINER SHOP
40' X 100'
PIPE SHOP
ENGINE ROOM
BOILER ROOM
STORE ROOM
SHOP
PAINT SHOP
OVERHEAD CRANE
OVERHEAD CRANE
DRY DOCK
LENGTH ON KEEL BLOCKS 502 FEET
S. 88° 19' E. 1000.00
R. 88° 19' E. 926.83
SLIP NO. 1. 555'X125'
14 FT. OF WATER AT ZERO ON GAUGE
SLIP NO. 2. 500'X125'
14 FT. OF WATER AT ZERO ON GAUGE
TIMBER-TRESTLE
IRON TRESTLE
IRON TRESTLE
TIMBER-TRESTLE
PRESENT LINE OF DREDGED SHIP CHANNEL DEC. 31, 1897
ESTABLISHED DOCK LINE
100.00
STONE
17 FT. OF WATER AT ZERO ON GAUGE
ENGINE POWER
WIRE ROPE
SHEAR LEGS
SPRING PILES
BLACK RIVER
19 FT. OF WATER AT ZERO ON GAUGE

FIG. 5.

air at 80 lbs. pressure to the forges, riveters and pneumatic hoists in the shops. The generator furnishes electricity for operating the rolls, punches, shears, drills, over-head cranes, wood-working machinery, and the lights in the yard and shops.

The boiler room contains three boilers, with space for a fourth should it be needed.

The coal room has a capacity of about 100 tons, and is arranged so that cars can be run overhead and unloaded through the bottom.

The machine shop is for light repairs only, the company having its large machine shop at Cleveland.

The main shops of the shipyard are in the steel building shown in Fig. 5 at the end of the space between the slips. This building is 125 ft. wide and 250 ft. long, and has a second floor used for a mould loft, 48 ft. wide and 250 ft. long. There are nine bents 31 ft. 3 ins. apart, and the intervening spaces are filled with the tools and machinery for punching, shearing and shaping the steel. Two over-head cranes travel the length of the building, and at the east end run out upon a trestle-work over the track upon which material is received. Attached to the columns of the building are jib cranes furnished with pneumatic hoists which handle the material at the various tools. At the south-east corner of the building there is an extension to the south, containing the heating furnaces, operated by crude oil, and the slabs for bending plates, angles, channels, etc. At the southwest corner and outside of the building there is an over-head crane to handle the frames and to tend the pneumatic riveter.

The mould loft is provided with wood-working machinery, and here are prepared the patterns for the different parts of the ship. The floor is a drawing board upon which the lines of the ship are laid down.

The blacksmith shop, 40 x 40 ft.; the coal room, 20 x 40 ft.; the joiner shop, 40 x 100 ft., and the pipe shop, 30 x 60 ft., are supplied with the necessary tools and machinery for their work, but offer no special features of interest. The same is true of the saw mill, which has a gang saw and a jig saw for timber work on wooden ships.

All the machinery not previously mentioned as run by compressed air is operated by electricity, except the hammer in the blacksmith shop, which is run by steam.

The office, 37 x 17 ft., contains rooms for the superintendent and

his clerks, a weighing room and a toilet room on the lower floor, and a parlor, dining-room and kitchen up stairs.

The shears, for lifting engines, boilers and other heavy articles into and out of vessels, are located on the river front between the dry dock and Slip No. 1. Their capacity is 60 tons.

The above-mentioned structures are all shown on the general plan (Fig. 5). There are two slips which are dredged out to a depth of 14 ft. The sides and ends are protected by piling and sheet piling anchored back to another row of piles as shown in Fig. 1.

Between the two slips are two berths for building ships. There is also room for another berth between "Slip No. 1" and the dry dock, and also between "Slip No. 2" and the south boundary of the property, but at present only two are equipped for use. The ships, when under construction, are supported upon blocking resting upon 12 x 12-in. oak timbers, which, in their turn, are supported by and bolted to piling. There are six rows of timbers under each ship. Over each berth there is a traveling crane operated by electric motors, and supported on the iron and timber trestles indicated in Fig. 5. The tops of these trestles are 35 ft. above the ground. The cranes handle the material from the shop or from tramcars on the railroad track below, and place the plates or frames where desired on the ship. The iron trestle is fixed in position, and the timber trestle is movable. When a ship is ready for launching, the timber trestle is removed by the overhead crane and carried back out of the way, leaving the side of the ship free towards the slip. Vessels built upon the lakes are launched sideways.

The result of the work has been very satisfactory, so far as it has at present been tested by actual use, and the indications point to its becoming more satisfactory as its various parts become settled into place and the operatives become familiar with them.

Since the completion of the dock, January 23d, 1898, there have been ten steamers docked and repaired, and there has been no settlement or change of shape in the dock, and no leakage through the floor or sides. In the shipyard there was launched, on April 13th, 1898, the steel steamer *Superior City*, 450 ft. long and 50 ft. beam, the longest ship ever launched on the lakes. There are now three other steamers under contract.

Following is a statement of the cost of construction of the Lorain dry dock and shipyard.

BILL OF MATERIAL.

Dry dock.

546—35′ white oak piles	19 110	lin. ft.
416—30′ " " "	12 480	"
323—25′ " " "	8 075	"
Total white oak	39 665	"
18—30′ soft wood piles	540	"
298—25′ " " "	7 450	"
2 386—20′ " " "	47 720	"
Total soft wood piles	55 710	"

290 880 feet B. M. oak timber.
144 000 " " hemlock timber.
67 234 " " pine timber.
444 530 " " " sheet piling.
32 000 " " " boards 1″ thick.
98 000 " " " flooring 4″ thick.
69 120 " " Oregon fir cross timbers, 12″ x 18″ x 64′ long.
208 000 " " white pine altars, 10″ x 14″, cut diagonally.
10 606 cu. ft. American Portland Cement concrete.
60 000 " yds. dredging and excavating.

Total cost of material and labor on above items	$97 009 89
" " steel gate and valves	10 789 70
" " pumps and engines for dock	4 512 53
Freight and transferring	1 189 35
Removing coffer-dam and completing approach	2 553 00
Engineering and incidentals	6 456 68
Total cost of dry dock	$122 511 15

Shipyard.

Earthwork (excavation and grading), 115 000 cu. yds	20 118 58
Shore protection, foundations for ship-building and dredging of slips and river front	40 038 10
Steel building for main shops	15 352 96
Brick power house and tunnel	14 379 64
Total cost of shipyard	$ 89 889 28
Brought forward, cost of dry-dock	122 511 15
Grand total	$212 400 43

This does not include the cost of tools, machinery, traveling cranes or engines and boilers, except the dry dock pumps, and the cost of such above-named items of machinery will amount to about $100 000.